



Massachusetts Department of Environmental Protection  
Source Water Assessment and Protection (SWAP) Report  
for

## Wenham Water Department

### What is SWAP?

The Source Water Assessment Program (SWAP), established under the federal Safe Drinking Water Act, requires every state to:

- inventory land uses within the recharge areas of all public water supply sources;
- assess the susceptibility of drinking water sources to contamination from these land uses; and
- publicize the results to provide support for improved protection.

**Table 1: Public Water System Information**

<i><b>PWS Name</b></i>	Wenham Water Department
<i><b>PWS Address</b></i>	91 Grapevine Road
<i><b>City/Town</b></i>	Wenham
<i><b>PWS ID Number</b></i>	3320000
<i><b>Local Contact</b></i>	Bruce Blanchard - Water Superintendent
<i><b>Phone Number</b></i>	978-468-5531

### Susceptibility and Water Quality

Susceptibility is a measure of a water supply's potential to become contaminated due to land uses and activities within its recharge area.

A source's susceptibility to contamination does *not* imply poor water quality.

Water suppliers protect drinking water by monitoring for more than 100 chemicals, disinfecting, filtering, or treating water supplies, and using source protection measures to ensure that safe water is delivered to the tap.

Actual water quality is best reflected by the results of regular water tests. To learn more about your water quality, refer to your water supplier's annual Consumer Confidence Reports.

### Introduction

We are all concerned about the quality of the water we drink. Drinking water wells may be threatened by many potential contaminant sources, including storm runoff, road salting, and improper disposal of hazardous materials. Citizens and local officials can work together to better protect these drinking water sources.

#### Purpose of this report:

This report is a planning tool to support local and state efforts to improve water supply protection. By identifying land uses within water supply protection areas that may be potential sources of contamination, the assessment helps focus protection efforts on appropriate best management practices (BMPs) and drinking water source protection measures.

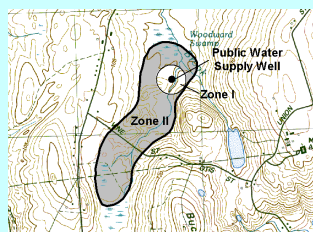
Refer to Table 3 for Recommendations to address potential sources of contamination. Department of Environmental Protection (DEP) staff are available to provide information about funding and other resources that may be available to your community.

#### This report includes the following sections:

1. Description of the Water System
2. Land Uses within Protection Areas
3. Source Water Protection
4. Additional Resources Available for Source Protection
5. Appendices

### What is a Protection Area?

A well's water supply protection area is the land around the well where protection activities should be focused. Each well has a Zone I protective radius and a Zone II protection area.



### Glossary

**Aquifer:** An underground water-bearing layer of permeable material that will yield water in a usable quantity to a well.

**Hydrogeologic Barrier:** An underground layer of impermeable material (i.e. clay) that resists penetration by water.

**Recharge Area:** The surface area that contributes water to a well.

**Zone I:** The area closest to a well; a 100 to 400 foot radius proportional to the well's pumping rate. This area should be owned or controlled by the water supplier and limited to water supply activities.

**Zone II:** The primary recharge area for the aquifer. This area is defined by hydrogeologic studies that must be approved by DEP. Refer to the attached map to determine the land within your Zone II.

## Section 1: Description of the Water System

**Zone II #: 131**

**Susceptibility: High**

Well Names	Source IDs
Pleasant Street G.P. Well #1	3320000-01G
Pleasant Street G.P. Well #2	3320000-02G

The wells for Wenham Water Department are located on the east side of Pleasant Street and south of Pleasant Pond. Each well has a Zone I radius of 400 feet. The wells are located in a semi-confined aquifer with a high vulnerability to contamination due to the absence of full hydrogeologic barriers (i.e. clay) that can prevent contaminant migration. Please refer to the attached map of the Zone II. Both wells have zinc orthophosphate added for corrosion control, and sodium fluoride added to prevent tooth decay.

For current information on monitoring results and treatment, please contact the Public Water System contact person listed above in Table 1 for a copy of the most recent Consumer Confidence Report. Drinking water monitoring reporting data is also available on the web at <http://www.epa.gov/safewater/ccr1.html>.

## Section 2: Land Uses in the Protection Areas

The Zone II for Wenham is a mixture of forest, residential, wetlands, crop and pasture land uses (refer to attached map for details). Land uses and activities that are potential sources of contamination are listed in Table 2, with further detail provided in the Table of Regulated Facilities and Table of Underground Storage Tanks in Appendix B.

### Key issues include:

1. Inappropriate Activities in Zone I
2. Underground Storage Tanks
3. Septic Systems
4. Stormwater Catch Basins
5. Comprehensive Wellhead Protection Planning

The overall ranking of susceptibility to contamination for Wenham is high, based on the presence of at least one high threat land use within the Zone II, as seen in Table 2.

**1. Inappropriate Activities in Zone I** – Some older wells may not meet the Zone I requirement. In many cases the land is owned by residents, businesses, farmers, or schools. Among the significant threats to water supplies are septic systems, fertilizers, storm water runoff and underground storage tanks which often accompany these land uses.

Wenham is currently working with landowners involved in an effort to negotiate a land swap or conservation easements for the land within Zone I.

### Inappropriate Activities in Zone I - Recommendations

- ✓ **Ownership or Control** - Investigate options for ownership or control of the Zone I. If outright ownership is not an immediate option, attempt to negotiate a Conservation Restriction for the purposes of providing and promoting exclusive and perpetual protection of water supply and water quality.

- ✓ **Agreement Options** - Until land is available, attempt to obtain a *Memorandum of Understanding*.

Memorandum of Understanding (MOU) is an agreement between the landowner and public water supplier in which the landowner agrees not to engage in specific threatening activities. The MOU should be specific to the land use or activity. For instance, if the land is residential with a septic system the owner could agree not to place chemicals, petroleum products, or other hazardous or toxic substances, including septic system cleaners into the septic system, and that the system will be pumped at a specific frequency. Understanding how an activity threatens drinking water quality is an important component of developing an effective MOU.

- ✓ **Septic System Relocation** – Coordinate efforts with the landowner to locate the septic system. If the septic system is located in the Zone I, determine the feasibility of relocating it outside of the Zone I.

**2. Underground Storage Tanks** – Underground storage tanks were commonly used for home heating oil. Many steel tanks still in use are aging and have little or no protection against the corrosive action of soil and water. In most cases, the presence of petroleum products in groundwater can be attributed to leaking underground storage tanks and piping systems, and accidental spills and leaks. Each tank is a threat to groundwater quality, with leaking tanks posing a serious threat.

#### **Underground Storage Tanks – Recommendations:**

- ✓ **Inventory**- With the assistance of the local fire department, Board of Health, and local fuel companies, determine the location of all underground storage tanks (including all abandoned tanks).
- ✓ **Inspection** – Once the location of tanks is determined, coordinate efforts with landowners to have tanks inspected.
- ✓ **Removal** – Develop a program to remove and properly dispose of abandoned tanks.
- ✓ **Local Controls** – Adopt an Underground Storage Tank Bylaw or Health Regulation to address permitting, installation, testing, removal, and other standards that are appropriate to the Town of Wenham.

**3. Septic Systems** – A properly designed, installed, and maintained septic system outside the Zone I poses no threat to groundwater. However, inadequately functioning and/or failing septic systems can contribute to the contamination of groundwater. Wastewater from septic systems may include many types of contaminants, such as nitrates, harmful bacteria, viruses, and hazardous waste.

#### **Septic Systems – Recommendations:**

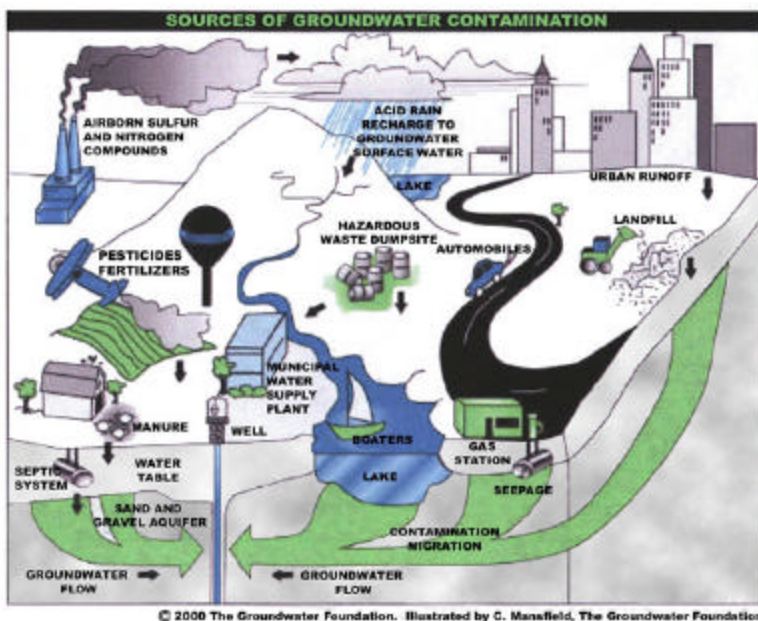
- ✓ **Education** - Distribute educational material to households about the importance of septic system maintenance. Septic system components should be located, inspected, and maintained on a regular basis. Refer to the attachments for more information regarding septic systems.

### **Benefits of Source Protection**

Source Protection helps protect public health and is also good for fiscal fitness:

- Protects drinking water quality at the source
- Reduces monitoring costs through the DEP Waiver Program
- Treatment can be reduced or avoided entirely, saving treatment costs
- Prevents costly contamination clean-up
- Preventing contamination saves costs on water purchases, and expensive new source development

Contact your regional DEP office for more information on Source Protection and the Waiver Program.



- ✓ **System Care** – Provide information to residents about using cleaning compounds that are safe for the septic system, on proper disposal practices, i.e. only sanitary waste in the septic system. Information on septic systems can be found at Massachusetts Department of Environmental Protection's website <http://www.state.ma.us/dep/brp/files/yoursyst.htm>.
- ✓ **Proper Disposal** - Educate residents on the problem of disposing of hazardous materials in septic systems. Residents should dispose of used oil, antifreeze, paints, and other household chemicals properly - not in septic systems.
- ✓ **Alternative Products** - Provide residents with information on options that are available to substitute less hazardous substances for many products used in the home.

**4. Stormwater Catch Basins** – Catch basins transport stormwater from roadways and adjacent properties to the ground. As flowing stormwater travels, it picks up debris and contaminants from streets, parking areas and lawns. Common potential contaminants include lawn chemicals, pet waste, leakage from dumpsters, household hazardous waste, and contaminants from vehicle leaks, maintenance, washing or accidents.



#### **Stormwater Catch Basins – Recommendations:**

- ✓ **Best Management Practices** - Work with the Town to develop Best Management Practices that are the most effective, practical means of preventing or reducing pollution from nonpoint sources. Information is available at <http://www.epa.gov/OWOW/NPS/roads.html>.
- ✓ **Local Controls** - Encourage local officials to develop a local stormwater ordinance. For more information see <http://www.epa.gov/owow/nps/ordinance/stormwater.htm>
- ✓ **Storm Drain Stenciling Program** - Work with local watershed groups to institute a Storm Drain Stenciling Program. For more information on how to develop a storm drain stenciling program go to <http://www.earthwater-stencils.com>.
- ✓ **Wellhead Protection Grants** – Continue working towards applying for a Wellhead Protection Grant from DEP for the purpose of addressing stormwater drainage in the Zone II, and for working with the Town to address the “Phase II Stormwater Regulations”.

**5. Protection Planning** - Protection planning prevents drinking water contamination by managing the land area that supplies water to a well. A Wellhead Protection Plan coordinates community efforts, identifies protection strategies, establishes a timeframe for implementation, and provides a forum for public participation. There are numerous resources available to help communities in developing a plan for protecting drinking water supply wells.

#### **Protection Planning - Recommendation:**

- ✓ **Local Controls** - Coordinate efforts with local officials in Wenham, Hamilton, Danvers, Beverly and Topsfield to compare existing controls with current MA Wellhead Protection Regulations 310 CMR 22.21(2). For more information on DEP land use controls see <http://www.state.ma.us/dep/brp/dws/>.

#### **What are "BMPs?"**

Best Management Practices are structural (i.e. oil & grease trap catch basins), nonstructural (i.e. hazardous waste collection days) or managerial measures that are used to protect and improve surface water and groundwater quality.

- ✓ **Develop a Wellhead Protection Plan** – Establish a local team, and refer them to <http://www.state.ma.us/dep/brp/dws/> for a copy of DEP's guidance, “Developing a Local Wellhead Protection Plan”.
- ✓ **Land Acquisition Plan** – Work with local officials to develop a land acquisition plan. Land acquisition projects protect water supplies by limiting the land development potential. Acquisitions can be accomplished by municipal water systems through conservation restrictions, land banking, land purchases and land donations. Sample conservation restrictions are available at <http://www.state.ma.us/dep/brp/dws/>. The Town of Wenham is fortunate that its Zone II still has significant forest (refer to attached maps for percentage of forest). However, future development of Zone II is a major concern. The Department recommends that the town acquire Zone II land closest to the Zone I or land that is subject to high-risk development (refer to Developing a local Wellhead Protection Plan).

### Potential Source of Contamination vs. Actual Contamination

The activities listed in Table 2 are those that typically use, produce, or store contaminants of concern, which, if managed improperly, are potential sources of contamination (PSC).

It is important to understand that a release may never occur from the potential source of contamination provided facilities are using best management practices (BMPs). If BMPs are in place, the actual risk may be lower than the threat ranking identified in Table 2. Many potential sources of contamination are regulated at the federal, state and/or local levels, to further reduce the risk.

**Table 2: Land Use in the Protection Areas (Zones I and II)**

For more information, refer to Appendix 2: Regulated Facilities within the Water Supply Protection Area

Activities	Quantity	Threat*	Potential Source of Contamination
<b>Commercial</b>			
Service Stations/ Auto Repair Shops	2	H	Automotive fluids, and solvents: spills, leaks, or improper handling
<b>Residential</b>			
Fuel Oil Storage (at residences)	Numerous	M	Fuel oil: spills, leaks, or improper handling
Lawn Care / Gardening	Numerous	M	Pesticides: over-application or improper storage and disposal
Septic Systems / Cesspools	Numerous	M	Hazardous chemicals: microbial contaminants, and improper disposal
<b>Miscellaneous</b>			
Aboveground Storage Tanks	Numerous	M	Materials stored in tanks: spills, leaks, or improper handling
Landfills and Dumps	1	H	Seepage of leachate
Small quantity hazardous waste generators	2	M	Spills, leaks, or improper handling or storage of hazardous materials and waste
Stormwater Drains/ Retention Basins	Numerous	L	Debris, pet waste, and chemicals in stormwater from roads, parking lots, and lawns
Transmission Line Rights-of-Way - Type: <u>high pressure natural gas</u>	1	L	Corridor maintenance pesticides: over-application or improper handling; construction
Underground Storage Tanks	3	H	Stored materials: spills, leaks, or improper handling
Utility Substation Transformers	Numerous	L	Chemicals and other materials including PCBs: spills, leaks, or improper handling
Very Small Quantity Hazardous Waste Generator	2	L	Spills, leaks, or improper handling or storage of hazardous materials and waste
Water Supply Protection Area % that is Sewered = 0%			
<b>Notes:</b> <ol style="list-style-type: none"> <li>When specific potential contaminants are not known, typical potential contaminants or activities for that type of land use are listed. Facilities within the watershed may not contain all of these potential contaminant sources, may contain other potential contaminant sources, or may use Best Management Practices to prevent contaminants from reaching drinking water supplies.</li> <li>For more information on regulated facilities, refer to Appendix 3: Regulated Facilities within the Water Supply Protection Area information about these potential sources of contamination.</li> <li>For information about Oil or Hazardous Materials Sites in your protection areas, refer to Appendix B: Tier Classified Oil and/or Hazardous Material Sites.</li> </ol>			
<p>* <b>THREAT RANKING</b> - The rankings (high, moderate or low) represent the relative threat of each land use compared to other PSCs. The ranking of a particular PSC is based on a number of factors, including: the type and quantity of chemicals typically used or generated by the PSC; the characteristics of the contaminants (such as toxicity, environmental fate and transport); and the behavior and mobility of the pollutants in soils and groundwater.</p>			



Other land uses and activities that may be potential contaminant sources include auto body shops, gas stations, and schools. Refer to Table 2 and Appendix 2 for more information about these land uses.

Identifying potential contaminant sources is an important initial step in protecting your drinking water sources. Further local investigation will provide more in-depth information and may identify new land uses and activities that are potential sources of contamination.

Once potential contaminant sources are identified, specific recommendations like those below should be used to better protect the Wenham wells.

### Section 3: Source Water Protection

Implementing source protection measures and Best Management Practices (BMPs) will reduce the Wenham Water Supply System's susceptibility to contamination. Additional source protection recommendations are listed in Table 3 and the Key Issues above.

Wenham is commended for taking an active role in promoting source protection measures in the Water Supply Protection Areas through:

- Adopting, through the Wenham Board of Health, a Groundwater Protection Regulation that meets current MA Wellhead Protection Regulations 310 CMR 22.21(2).
- Applying for a Source Water Protection Grant to identify and inspect existing residential underground fuel oil tanks.
- Performing catch basin inspections, maintenance, and cleaning on an annual basis. Additionally, street and parking lot sweeping is conducted in the spring.

Appendix 1 includes specific recommendations for each of the following:

#### Additional Documents:

To help with source protection efforts, more information is available by request or online at [www.state.ma.us/dep/brp/dws](http://www.state.ma.us/dep/brp/dws) including:

1. Water Supply Protection Guidance Materials such as model regulations, Best Management Practice information, and general water supply protection information.
2. MA DEP SWAP Strategy
3. Land Use Pollution Potential Matrix
4. Draft Land/Associated Contaminants Matrix

#### ➤ Partner with Local Businesses:

Since many small businesses and industries use hazardous materials and produce hazardous waste products, it is essential to educate the business community about drinking water protection. Encouraging partnerships between businesses, water suppliers, and communities will enhance successful public drinking water protection practices.

#### ➤ Educate Residents:

If managed improperly, household hazardous waste, septic systems, lawn care, and pet waste can all contribute to groundwater contamination. Hazardous materials include automotive wastes, paints, solvents, pesticides, fertilizers, and other substances. If a septic system fails or is not properly maintained, it could be a potential source of microbial contamination. Animal waste is also a source of microbial contamination.

#### ➤ Provide Outreach to the Community:

Public education and community outreach ensure the long-term protection of drinking water supplies. Awareness often generates community cooperation and support. Residents and business owners are more likely to change their behavior if they know where the wellhead protection recharge area is located; what types of land uses and activities pose threats; and how their efforts can enhance protection.

#### Top 5 Reasons to Develop a Local Wellhead Protection Plan

- ❶ Reduces Risk to Human Health
- ❷ Cost Effective! Reduces or Eliminates Costs Associated With:
  - ♦ Increased groundwater monitoring and treatment
  - ♦ Water supply clean up and remediation
  - ♦ Replacing a water supply
  - ♦ Purchasing water
- ❸ Supports municipal bylaws, making them less likely to be challenged
- ❹ Ensures clean drinking water supplies for future generations
- ❺ Enhances real estate values – clean drinking water is a local amenity. A community known for its great drinking water in a place people want to live and businesses want to locate.

**Table 3: Current Protection and Recommendations**

<b>Protection Measures</b>	<b>Status</b>	<b>Recommendations</b>
<b>Zone I</b>		
Does the Public Water Supplier (PWS) own or control the entire Zone I?	<b>NO</b>	Follow Best Management Practices (BMP's) that focus on good housekeeping, spill prevention, and operational practices to reduce the use and release of hazardous materials.
Is the Zone I posted with "Public Drinking Water Supply" Signs?	<b>YES</b>	Additional economical signs are available from the Northeast Rural Water Association (802) 660-4988.
Is Zone I regularly inspected?	<b>YES</b>	Continue daily inspections of drinking water protection areas.
Are water supply-related activities the only activities within the Zone I?	<b>NO</b>	Continue monitoring non-water supply activities in Zone Is.
<b>Municipal Controls</b> (Zoning Bylaws, Health Regulations, and General Bylaws)		
Does the municipality have Wellhead Protection Controls that meet 310 CMR 22.21(2)?	<b>YES</b>	The Town "Aquifer Protection District" bylaw meets DEP's best efforts for wellhead protection. Refer to <a href="http://www.state.ma.us/dep/brp/dws/">www.state.ma.us/dep/brp/dws/</a> for model bylaws and health regulations, and current regulations.
Do neighboring communities protect the Zone II areas extending into their communities?	<b>SOME</b>	Hamilton has incorporated Wenham's Zone II in their Groundwater Protection Overlay District. Work with Danvers, Topsfield, and Beverly to include Wenham's Zone IIs in their wellhead protection controls.
<b>Planning</b>		
Does the PWS have a Wellhead Protection Plan?	<b>NO</b>	Develop a wellhead protection plan. Follow "Developing a Local Wellhead Protection Plan" available at: <a href="http://www.state.ma.us/dep/brp/dws/">www.state.ma.us/dep/brp/dws/</a> .
Does the PWS have a formal "Emergency Response Plan" to deal with spills or other emergencies?	<b>YES</b>	Augment plan by developing a joint emergency response plan with fire department, Board of Health, DPW, and local and state emergency officials. Coordinate emergency response drills with local teams.
Does the municipality have a wellhead protection committee?	<b>NO</b>	Establish committee; include representatives from citizens' groups, neighboring communities, and the business community.
Does the Board of Health conduct inspections of commercial and industrial activities?	<b>N/A</b>	For guidance see "Hazardous Materials Management: A Community's Guide" at <a href="http://www.state.ma.us/dep/brp/dws/files/hazmat.doc">www.state.ma.us/dep/brp/dws/files/hazmat.doc</a>
Does the PWS provide wellhead protection education?	<b>YES</b>	Aim additional efforts at commercial, and municipal uses within the Zone II.

**Plan for the Future:**

One of the most effective means of protecting water supplies is planning, such as the adoption of local controls to protect watersheds and ground water. These controls may include health regulations, general ordinances, and zoning bylaws that prohibit potential sources of contamination from wellhead protection areas.

Citizens and community officials should use this SWAP report to spur discussion of local drinking water protection measures. These recommendations are only part of your ongoing local drinking water source protection.

**Section 4: Additional Resources Available for Source Protection**

DEP staff, informational documents, and resources are available to help you build on this SWAP report as you continue to improve drinking water protection in your community.

The assessment and protection recommendations in this SWAP report are provided as a tool to spur community discussion, support ongoing source protection efforts, and help set local drinking water protection priorities.

The water supplier should supplement this SWAP report with local information on potential sources of contamination and land uses. To aid in the protection of the wells, local information should be maintained and updated periodically to reflect land use changes in the Zone II. Use this information to set priorities, target inspections, focus education efforts, and to develop a long-term drinking water source protection plan.

**Funding Resources:**

The Department's Wellhead Protection Grant Program and Source Protection Grant Program provide funds to assist public water suppliers in addressing Water Supply Source Protection through local projects. Protection recommendations discussed in this document may be eligible for funding under the Grant Program. For additional information, please refer to the program fact sheet from this year. Please note: each spring DEP posts a new Request for Response for the Grant program (RFR).

Other grants and loans are available through the Drinking Water State Revolving Loan Fund, the Clean Water State Revolving Fund, and other sources. For more information on grants and loans, visit the Bureau of Resource Protection's Municipal Services web site at: <http://www.state.ma.us/dep/brp/mf/mfpubs.htm>.

**For More Information**

Contact Anita Wolovick in DEP's Wilmington Office at (978) 661-7768 for more information and assistance on improving current protection measures.

Copies of this report have been provided to the public water supplier, town boards, and the local media.

**Section 5: Appendices**

1. Protection Recommendations
2. Regulated Facilities within the Water Supply Protection Area
3. Additional Documents on Source Protection in Wenham